

WHAT IS CLAIMED IS:

1. A method for judging a paper jam in an image forming apparatus, comprising the steps of:
  - a) checking a feed sensor unit;
  - b) operating a timer if it is judged that the feed sensor unit is switched to an “ON” state in the step (a);
  - c) calculating a value  $T_1$  for a fuse lamp drive unit to be in an “ON” state;
  - d) comparing the value  $T_1$  with a reference value  $T_2$ ; and
  - e) judging a paper jam and aborting a printing operation if the value  $T_1$  is out of an error range of the value  $T_2$  in the comparison of the step (d).
2. The method of claim 1, further comprising the step of:  
proceeding with the printing operation if the value  $T_1$  is within the error range of the value  $T_2$  and the feed sensor unit is switched to an “OFF” state after a predetermined time.
3. The method of claim 1, wherein the error range is defined as a value substantially within  $\pm 10\%$  of the value  $T_2$ .
4. The method of claim 1, further comprising the step of displaying a message indicating the paper jam on a display.
5. The method of claim 1, wherein the value  $T_2$  is an average value of a time for the fuse lamp drive unit to be in the “ON” state where the printing paper is delivered to a fuser in a normal condition.
6. A method of judging a paper jam in an image forming apparatus, comprising

the steps of:

- a) checking a pickup sensor unit;
- b) checking a feed sensor unit if it is judged that the pickup sensor unit is in an “ON” state in the step (a);
- c) operating a timer if it is judged that the feed sensor unit is switched to an “ON” state in the step (b);
- d) calculating a value  $T_1$  for a fuse lamp drive unit to be in an “ON” state;
- e) comparing the value  $T_1$  with a reference value  $T_2$ ; and
- f) judging a paper jam and aborting a printing operation if the value  $T_1$  is out of an error range of the value  $T_2$  in the comparison of the step (e).

7. The method of claim 6, further comprising the step of judging a no printing paper condition and aborting the printing operation if the pickup sensor unit is judged to be in an “OFF” state in the step (a).

8. The method of claim 6, further comprising the step of judging the paper jam condition and aborting the printing operation if the feed sensor unit is judged to be in an “OFF” state after a predetermined time in the step (b).

9. The method of claim 6, further comprising the step of:

proceeding with the printing operation if the value  $T_1$  is within the error range of the value  $T_2$  and if the feed sensor unit is switched to an “OFF” state after a

predetermined time.

10. The method of claim 6, wherein the error range is defined as a value substantially within  $\pm 10\%$  of value  $T_2$ .

11. The method of claim 6, further comprising the step of displaying a message indicating the paper jam on a display.

12. The method of claim 6, wherein the value  $T_2$  is an average value of a time for the fuse lamp drive unit to be in the “ON” state where the printing paper is delivered to a fuser in a normal condition.

13. A system for detecting a paper delivery abnormality in a device, such as an image forming apparatus, using at least one of a feed sensor unit and fuser temperature controller, the system comprising:

a feed sensor unit, having a sensor and actuator for detecting a leading paper edge and in response switching to an “ON” state, and for detecting a rear paper edge and in response switching to an “OFF” state;

a fuser, having at least one heating element and heating roller to fix an image on a paper surface;

a fuser temperature controller, for maintaining a temperature at said heating roller at a substantially constant predetermined temperature by energizing said heating element;

at least one timer, for monitoring said fuser temperature controller to measure a value  $T_1$ , wherein said value  $T_1$  is a period said heating element is energized; and

a controller, for detecting a paper delivery abnormality based upon said feed sensor unit state, value  $T_1$  and a reference value  $T_2$ , wherein said reference value  $T_2$  is a

reference period said heating element is energized during normal paper delivery.

14. A system for detecting a paper delivery abnormality in a device as claimed in claim 13, wherein said controller detects a paper delivery abnormality when said feed sensor unit switches to an “ON” state, and after a predetermined period does not switch to an “OFF” state.

15. A system for detecting a paper delivery abnormality in a device as claimed in claim 13, wherein said controller detects a paper delivery abnormality when said feed sensor unit switches to an “ON” state, and after a predetermined period switches to an “OFF” state, and the value  $T_1$  is greater than or less than the reference value  $T_2$ .

16. A system for detecting a paper delivery abnormality in a device as claimed in claim 15, wherein said reference value  $T_2$  comprises a range including substantially  $\pm 10\%$  of said reference period said heating element is energized during normal paper delivery.

17. A system for detecting a paper delivery abnormality in a device as claimed in claim 13, further comprising a pickup sensor unit, having a sensor for detecting a paper stack presence and in response switching to an “ON” state, and wherein said controller detects a paper delivery abnormality when said pickup sensor unit is in an “OFF” state.

18. A method for detecting a paper delivery abnormality in a device, such as an image forming apparatus, using at least one of a feed sensor unit and fuser temperature controller, the method comprising the steps of:

detecting an input paper at a feed sensor unit and monitoring said feed sensor unit to detect a transition between an “OFF” and “ON” state to indicate normal input paper delivery based upon said transition, and detecting a paper delivery abnormality when said normal input paper delivery is not detected;

monitoring a fuser temperature controller and measuring a value  $T_1$  wherein said value  $T_1$  is a period said fuser temperature controller energizes a heating element to fix an image on said input paper; and

comparing said value  $T_1$  with a reference value  $T_2$ , wherein said reference value  $T_2$  is a reference period said heating element is energized during normal paper delivery, and detecting a paper delivery abnormality when said normal input paper delivery is detected and said value  $T_1$  is greater than or less than the reference value  $T_2$ .

19. A method for detecting a paper delivery abnormality in a device as claimed in 18, wherein said reference value  $T_2$  comprises a range including substantially  $\pm 10\%$  of said reference period said heating element is energized during normal paper delivery.

20. A method for detecting a paper delivery abnormality in a device as claimed in claim 18, further comprising the step of:

detecting an input paper at a pickup sensor unit, and detecting a paper delivery abnormality when an input paper is not detected.